

1.0 INTRODUCTION

1.1 PURPOSE

The Office of Civilian Radioactive Waste Management (OCRWM) Program Business Plan has been developed to document the overall business and contracts strategy for OCRWM. Revision 2 of the OCRWM Program Plan [Reference 1] documents the Program's mission, vision, strategic objectives, strategies, and success measures, and provides a description of Program activities and milestones through Fiscal Year 2003. The Viability Assessment identifies assumptions, task descriptions, schedules, and cost estimates associated with implementing the OCRWM Program for the Yucca Mountain Site Characterization Project from Fiscal Year 2002 through Fiscal Year 2010. The concepts and strategies discussed in this plan are predicated on receiving funding, necessary approvals, and other factors set forth in the Viability Assessment. Major milestones and information in the Viability Assessment that are contingent on the Yucca Mountain site being recommended to and approved for development by the President and Congress include:

- Submittal of a License Application in Fiscal Year 2002.
- Continued progress with a Construction Authorization planned for Fiscal Year 2005.
- Submittal of an updated License Application in March 2008.
- Receipt of a license to receive and possess waste with initial waste emplacement occurring in Fiscal Year 2010.
- Distribution of annual estimated costs.

Due to the long-term nature of this Program, the OCRWM Program Business Plan is a living document that sets forth the planning and informational bases for future business and contract strategies for the OCRWM Program from the present through the Repository Operations and Emplacement Phase to Closure and Decommissioning. As currently structured, the OCRWM Program Business Plan provides historical information, references to other relevant Program documents, and discussions of activities and processes that will be developed further. The near-term focus is on the integration of site data, repository design, and performance assessment to support a decision on the suitability of the Yucca Mountain site and afterward licensing that site if a decision is made to proceed with development. Changes and updates will continue, as necessary, throughout the life of the OCRWM Program as new technologies and procurement methods evolve. Moreover, it is likely that experience gained in working the first phase—namely, design and licensing—may affect how Department of Energy (DOE) chooses to proceed in subsequent contract awards for construction and operations.

The OCRWM Program Business Plan includes the Program's business and contracting strategy for the Yucca Mountain Site Characterization Project; the Acceptance, Transportation, and Integration Project; and the OCRWM Program Management Center.

1.2 HISTORICAL PERSPECTIVE

The Nuclear Waste Policy Act of 1982, as amended (NWPA), established OCRWM within the DOE and assigned to OCRWM the responsibility to develop, construct, and operate a system for spent nuclear fuel and high-level radioactive waste disposal, including a permanent geologic repository, interim storage capability, and transportation system.

OCRWM is headquartered in Washington, D.C. Its Director reports to the Secretary of Energy through the Deputy Secretary. OCRWM carries out its mission through two project-level business centers—the Yucca Mountain Site Characterization Project in Las Vegas, Nevada, and the Acceptance, Transportation, and Integration Project at OCRWM Headquarters (previously referred to as the Waste Acceptance, Storage, and Transportation Project)—and the Program Management Center at OCRWM Headquarters.

DOE has been studying a site at Yucca Mountain, Nevada, for more than 15 years to determine whether it is a suitable location to build a geologic repository for the nation's spent nuclear fuel and high-level radioactive waste. In addition, the Office of Acceptance, Transportation, and Integration has been addressing issues related to and including acceptance and transportation of spent nuclear fuel and high-level radioactive waste for eventual emplacement in a repository. Acceptance, Transportation, and Integration activities focus on the development of processes for the legal and physical transfer of commercial spent nuclear fuel to the federal government, creation of a national transportation capability for waste acceptance and transportation, and resolution of institutional issues with OCRWM Program stakeholders. The Office of Acceptance, Transportation, and Integration also coordinates with a broad network of state, tribal, and local government officials; industry representatives; utility organizations; technical experts; and private citizens who have an interest in how DOE will transport spent nuclear fuel and high-level radioactive waste [Reference 1, pages 38–40].

1.3 GEOLOGIC DISPOSAL

Geologic disposal of radioactive waste has been the focus of scientific research for more than 40 years. As early as 1957, a National Academy of Sciences report to the Atomic Energy Commission recommended burying radioactive waste in geologic formations. In 1962, the Atomic Energy Commission began investigating salt formations—including bedded salt and salt domes—as potential host rocks for repositories. In 1975, the Energy Research and Development Administration, one of the predecessors to DOE, selected a site near Carlsbad, New Mexico, for the disposal of transuranic waste as part of the Waste Isolation Pilot Project. In 1976, the Energy Research and Development Administration began investigating other geologic formations and considering different disposal concepts, including deep-seabed disposal, disposal in the polar ice sheets, and rocketing waste into the sun. In 1981, after an extensive evaluation of the options, DOE concluded that disposal in a geologic repository was still the preferred option.

1.4 LAWS AND REGULATIONS

The NWPA directed DOE to develop a system for safe and permanent disposal of spent nuclear fuel and high-level radioactive waste. Congress and the President decided that the generation who received the economic benefits of nuclear power and national security benefits of nuclear

weapons had an obligation to bear the political and financial costs of developing the management options for these materials [Reference 2, page 6].

To meet that obligation, the NWSA set an ambitious schedule for DOE to site two geologic repositories and begin accepting waste for disposal in the first repository by January 31, 1998. DOE formally identified nine potentially acceptable sites across the nation and later narrowed the list to three promising sites—Deaf Smith County, Texas; Hanford, Washington; and Yucca Mountain, Nevada. In 1987, the NWSA was amended to direct DOE to concentrate its studies on only the Yucca Mountain site to determine its suitability for development as a repository. This legislation, known as the Nuclear Waste Policy Amendments Act of 1987, also established the Nuclear Waste Technical Review Board, which is composed of experts appointed by the President to review and comment on the Yucca Mountain Site Characterization Project.

Beyond reaffirming the federal government's responsibility for developing repositories for the permanent disposal of spent nuclear fuel and high-level radioactive waste, the NWSA also affirmed the responsibility of the waste generators (e.g., nuclear utilities, federal defense nuclear program) to pay for that effort. The NWSA requires utilities with nuclear power plants to pay a fee to help fund the disposal program. The federal government bears the disposal costs for defense waste.

The NWSA also assigns distinct roles to the Environmental Protection Agency and the Nuclear Regulatory Commission. The NWSA directs the Environmental Protection Agency to establish standards for protecting the general environment against the release of radioactive material from a repository. The Nuclear Regulatory Commission is responsible for establishing technical requirements and criteria, consistent with the Environmental Protection Agency standards, for approving or disapproving applications to construct, operate, and eventually close a repository. In 1981 and 1983, the Nuclear Regulatory Commission issued regulations for a geologic repository in anticipation of the Environmental Protection Agency standards.

Subsequently, the Energy Policy Act of 1992 created a new process for setting environmental standards for the Yucca Mountain repository. The Energy Policy Act directs the National Academy of Sciences to provide findings and recommendations on reasonable standards for the protection of the public health and safety. It also directs the Environmental Protection Agency to issue public health and safety standards for the Yucca Mountain site based on, and consistent with, the National Academy of Sciences' findings and recommendations. Once this has been accomplished, the Nuclear Regulatory Commission will revise its technical requirements and criteria, as necessary, to be consistent with the new Environmental Protection Agency standards. The National Academy of Sciences issued its report in 1995, and the Environmental Protection Agency currently is developing its standards [Reference 2, page 8].

1.5 LOCATION

The OCRWM Program continues to focus on core activities that will precede acceptance and transportation of spent nuclear fuel from reactor sites to a federal facility, such as a potential geologic repository at Yucca Mountain [Reference 1, pages 39–40]. Currently, spent nuclear fuel and high-level radioactive waste are being stored temporarily at 77 locations in 35 states (Figure 1-1). Some of these storage sites are close to population centers and/or are located near

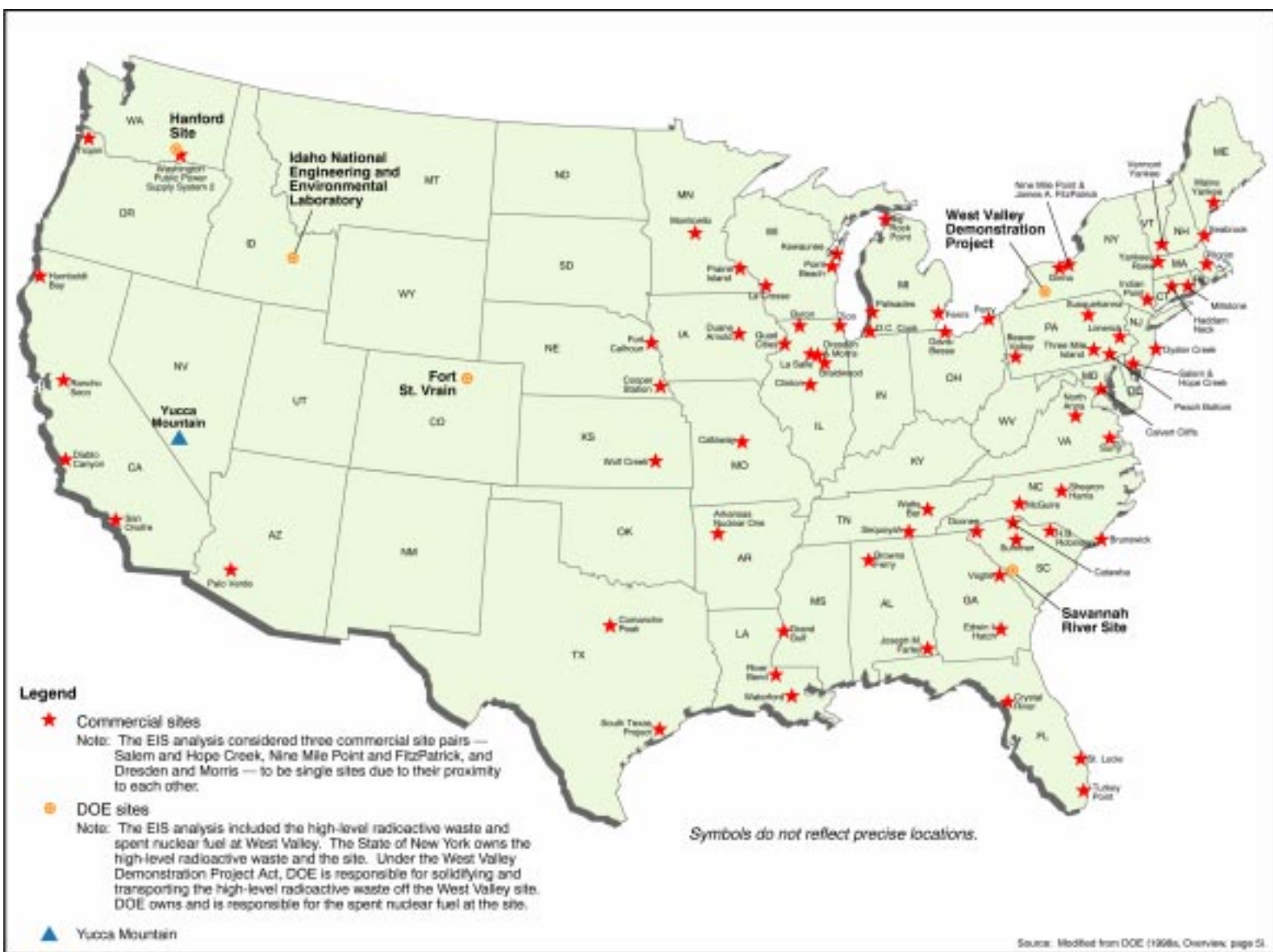


Figure 1-1. Location of Commercial and DOE Sites and Yucca Mountain

ivers, lakes, and seacoasts. If left in their current locations for an indefinite period of time, the stored materials could become a hazard to nearby populations and the environment [Reference 2, page 5]. Although the OCRWM Program has altered its priorities over the years in response to direction from Congress and the President, transportation issues have remained relatively consistent. DOE will develop transportation plans and operation strategies, along with state, tribal, and local preparedness organizations. Safe routine transportation and emergency response activities are an integral part of the OCRWM Program.

The potential geologic repository is located approximately 100 miles northwest of Las Vegas, Nevada, away from the population centers. It borders the edge of the nation's nuclear weapons test site, where more than 900 nuclear tests have been conducted. This unpopulated land is owned by the federal government [Reference 2, page 10].

1.6 FACILITY OVERVIEW

If the site is determined to be suitable and subsequently licensed, spent nuclear fuel and high-level radioactive waste will be transported to Yucca Mountain by truck and/or rail in specially designed, shielded shipping containers that have been approved by the Nuclear Regulatory Commission. When it arrives at Yucca Mountain, the waste will be removed from the shipping casks and placed in sealed, long-lived waste packages for underground disposal; carried into the underground repository by rail; placed on supports in the tunnels; and monitored during the preclosure period. The repository system will be capable of handling the following types of waste:

- Commercial spent nuclear fuel assemblies.
- Commercial spent nuclear fuel in disposable canisters.
- Commercial nuclear fuel in nondisposable canisters.
- DOE and Navy spent nuclear fuel in disposable canisters.
- DOE spent nuclear fuel in nondisposable canisters (on a case-by-case basis).
- Commercial and defense high-level waste in disposable canisters.

The repository facilities will be designed to implement the following functions:

- Receipt and preparation for disposal of the previously mentioned waste types.
- Repository transport/transfer.
- Underground excavation and construction.
- Waste emplacement and retrieval.
- Waste monitoring.

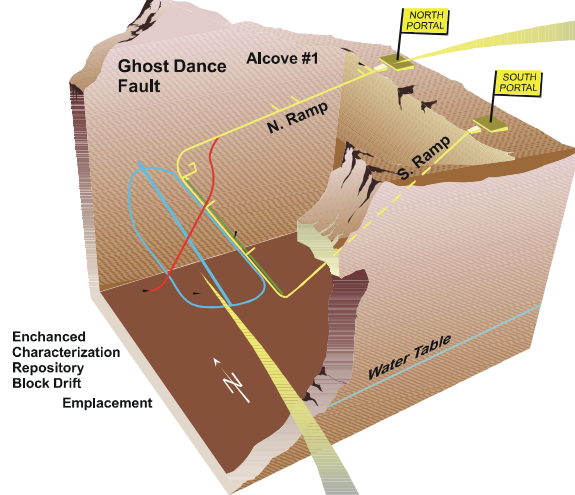
- Tunnel ventilation.
- Radioactive exposure/contamination control.
- Security operations and safeguards.
- Low-level radioactive and other nondisposable waste collection and transport for off-site disposal.
- Final closure and decommissioning.

In addition to the specific functions identified above, the repository facilities will provide for:

- Fire protection.
- Offices and administration areas.
- Mockup and worker training.
- Utilities.
- Material warehousing.
- Maintenance shops and work areas.
- Emergency/dispensary facilities.
- Parking.

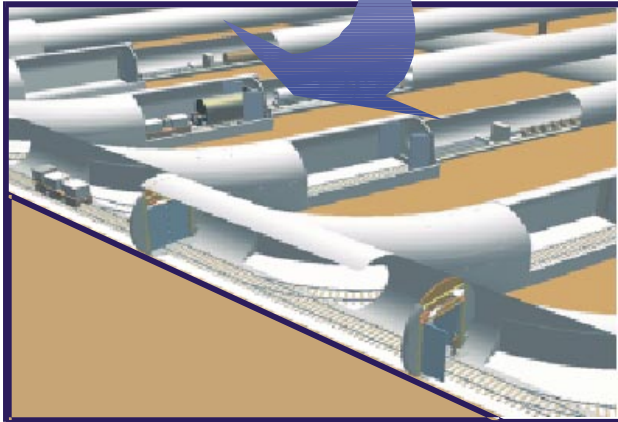
The surface facilities (Figure 1-2) will be designed to receive waste and prepare it for final disposal and to support the excavation, construction, loading, and ventilation of the repository tunnels. The surface layout would cover approximately 100 acres. The main area would be located at the North Portal entrance to the underground repository and would contain the necessary facilities and equipment to remove the waste from the shipping casks. The waste would then be placed in Nuclear Regulatory Commission-approved waste packages and loaded on a special rail car for underground transport. This area would consist of a radiologically controlled area and a balance-of-plant area. The radiologically controlled area would consist of the waste handling, waste treatment, carrier preparation, transporter maintenance, and airlock buildings. The balance-of-plant facilities would include warehouses, shops, administration areas, mockup facilities, utilities, medical facilities, a service station, security stations, and a fire station. A second area, located at the South Portal entrance, would accommodate the facilities to support the excavation and construction of underground tunnels. Facilities that house the air intake and exhaust fans for ventilating the tunnels would be located in different areas near the top of Yucca Mountain. Alternative energy sources such as wind or solar could provide power for the surface facilities and repository systems.

Repository Layout



Surface Layout

Waste Receiving



Subsurface Layout

Waste Emplacement

To accommodate 70,000 metric tons, the proposed repository will include approximately 100 emplacement tunnels (73 miles of tunnels), each up to 0.62 miles in length; approximately 100 waste packages will be emplaced in each tunnel.

Figure 1-2. Proposed Surface and Underground Facilities at Yucca Mountain

The subsurface facilities (Figure 1-2) would consist of approximately 100 miles of tunnels. The main tunnels are designed for moving people, equipment, and waste packages. The ventilation tunnels are designed for circulating air to the workers and maintaining required temperatures in the repository. The emplacement drifts would accommodate the waste packages. Two gently sloping access ramps, along with the vertical ventilation shafts, would connect the underground and surface areas [Reference 2, page 14].

Due to the complex nature of siting, developing, and licensing a repository, the design for the facilities could change significantly as new technical advancements, cost-effective solutions, and/or new requirements are identified. The repository design is flexible and can evolve to take advantage of future advances and technologies that may become available.

The time envisioned to complete the waste disposal program ranges from the present through 2116. During this time, the Program will evolve through several distinct phases, as shown in Figure 1-3. The phases depicted in Figure 1-3 reflect emplacement of all planned waste to include all commercial spent nuclear fuel. With this consideration, the phases are slightly different than those depicted and referenced in Volume 5 of the Viability Assessment [Reference 4]. The phases of the OCRWM Program, as described in the Total System Life Cycle Cost [Reference 5], are:

- Site Characterization, Development, and Evaluation (Present–2002).
- Licensing (2002–2005).
- Construction (2005–2009).
- Mobilization and Acquisition (2005–2010).
- Waste Acceptance and Transportation (2010–2041).
- Repository Operations and Emplacement (2010–2041).
- Monitoring (2041–2110).
- Closure and Decommissioning (2110–2116).

These phases may or may not correspond to the potential contract periods of performance. The contract periods of performance are discussed in Section 2.0 and depicted graphically in Figure 2-1. Schedules for the potential contract periods of performance are presented in Section 6.0. The need for pre- and post-phase planning and closeout activities may require the contract periods of performance to begin prior to the start of an actual Program phase or extend past completion of the Program phase.

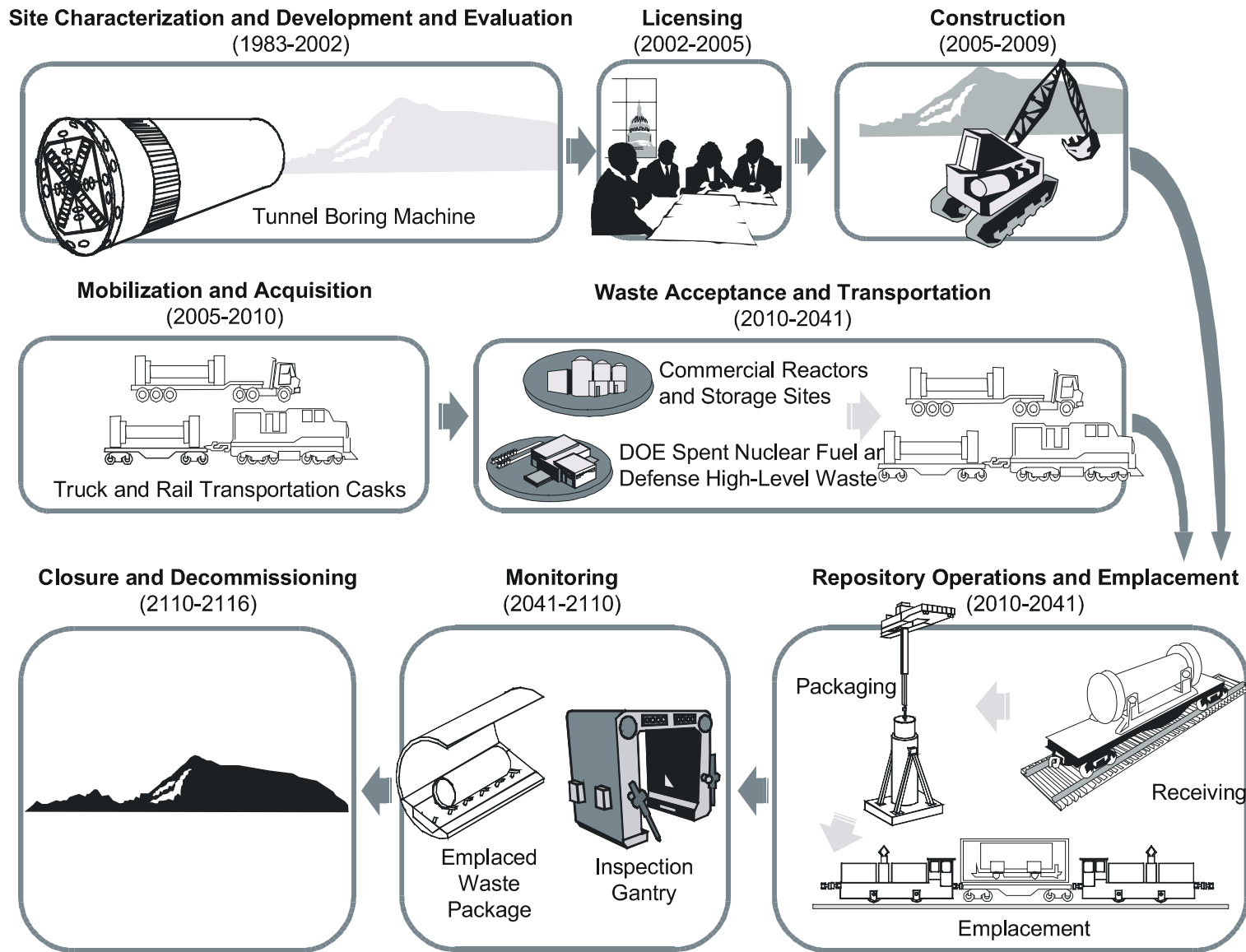


Figure 1-3. Program Phases